

Design the Enterprise Architecture Model TOGAF 9.2 for PT Service Applications Management at PT. XXX

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Abstrak

Enterprise architecture memiliki peran penting dalam mendukung tujuan bisnis di era digital yang terus berkembang. Penelitian pada aplikasi layanan PT. XXX, di mana metode penelitian kualitatif digunakan, melibatkan wawancara dengan Kepala perusahaan. Pendekatan ini mengacu pada dasar teori arsitektur dan enterprise architecture, dengan menggunakan framework TOGAF untuk analisis. Melalui tahapan Preliminary hingga Architecture Change Management, TOGAF ADM versi 9.2 diimplementasikan untuk merancang arsitektur yang relevan. Hasil penelitian memberikan perancangan arsitektur dari aplikasi layanan dan menunjukkan pembuatan IT Roadmap yang menjadi rekomendasi berdasarkan tujuan arsitektur perusahaan yang telah ditetapkan.

Kata Kunci: TOGAF versi 9.2, Pelayanan, Aplikasi, Enterprise Architecture

Abstract

Enterprise architecture has an important role in supporting business goals in the ever-growing digital era. Research on PT service applications. XXX, where qualitative research methods are used, involves interviews with Heads of companies. This approach refers to basic architectural theory and enterprise architecture, by using framework TOGAF for analysis. Through stages Preliminary until Architecture Change Management, TOGAF ADM version 9.2 is implemented to design the relevant architecture. The research results provide architectural design of service applications and demonstrate IT creation Roadmap which becomes a recommendation based on the company architecture objectives that have been set.

Keywords: TOGAF Version 9.2, Services, Applications, Enterprise Architecture

1. Introduction

Technology and information systems are now very important for the success of businesses and organizations. One of the investments in information technology that organizations need to make to meet all their information technology needs is infrastructure. Many publications discuss the importance of data integration in a company which is a very large organization. One of the goals of a growing organization is to make well-formatted data available in a single, well-managed data source. This can only be achieved with careful preparation and strategy selection. Adopting or creating an enterprise architecture framework is necessary before starting to build *enterprise architecture* (EA).

Information systems strategic planning is a set of long-term business plans that outline system objectives and technology architecture in relation to organizational goals. Currently, one of the most important factors in achieving business goals is the strategic design of information systems. A company's ability to succeed depends on its ability to obtain accurate, timely, and relevant information. Therefore, to determine the business information system goals that must be achieved in the coming year, strategic planning is needed. Information technology continues to bring strategic improvements. Information technology continues to bring positive improvements to various fields of work. Therefore, a business must use technology to increase productivity.

The use of methodology is the most important component in the information systems strategic planning process because it can highlight the objectives and procedures set. *Open Group Architecture Framework* (TOGAF), *Enterprise Architecture Planning* version of Steve H. Spewak, *Information Engineering* (IE) James Martin version, and *Strategic Planning Information System* (SPIS) version by John Ward and Joe Peppard are several techniques that can be used in information systems strategic planning. When assessing an organization or company's readiness for implementation, processes and technology also play a major role. The TOGAF ADM technique, a general approach that includes a collection of activities used in modeling enterprise architecture creation, was used by the authors in this research. Information systems architecture for a company can be planned, designed, developed, and

implemented using this approach as a guide or tool. Because TOGAF ADM can be modified to meet changing requirements during the design process, TOGAF ADM is a versatile approach that can recognize different modeling methodologies used in design.

2. Research methods

The research method used to collect data in this study is qualitative research. Qualitative research is an analytical approach that focuses on the data obtained, and then develops it based on certain patterns to form hypotheses. Data was collected through interviews with the company PT. XXX. Information resulting from the interview will be recorded in writing and then transcribed, to be further analyzed according to relevant areas. Figure 1 below shows a diagram illustrating the research method applied.

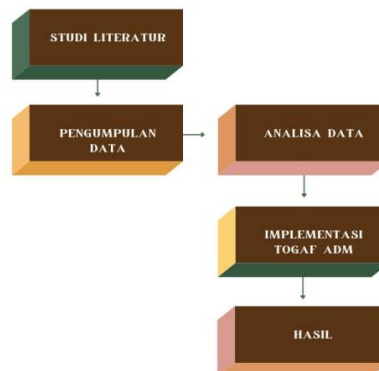


Figure 1. Research methodology

The initial step in this research includes conducting a previous literature study that is relevant to the case being faced by the researcher. After researching the literature, the researcher then chose the most appropriate framework for the case, and in this case, the researcher decided to use the TOGAF framework. After establishing the framework, researchers began the data collection process by interviewing company heads. The next step involved analyzing the data obtained from the interviews, with the aim of creating a relevant architectural design for this research.

3. Theoretical basis

There is a theoretical explanation in the theoretical basis, which is used as a reference and literature review to compare with current research case studies. The following is the theoretical basis and literature review.

3.1 Basic theory

3.1.1 Architecture

Some definitions of architecture include "architecture" as the components of a system consisting of structured networks, hardware, and software, as well as general definitions relating to physical construction. The overall design of the type of construction, whether physical or contextual, real or virtual. From the definitions already mentioned, it can be concluded that architecture basically describes the form of system construction depicted in the blueprint model from various points of view.

3.1.2 Enterprise Architecture

Enterprise architecture is a systematic approach that aims to produce a comprehensive and structured representation of a business. This approach involves developing a logical, unified, and complete overview, covering key aspects such as business architecture, information architecture, application architecture, and technology architecture. By detailing and integrating these elements, *enterprise architecture* helps create a deep understanding of how the various components of an organization are interconnected and support each other. The application of this business design is not only limited to certain organizations or companies, but can be adopted by various business entities. However, it is important to use a method or structure that has been tested and is available to ensure its consistency and effectiveness. By using enterprise architecture, an entity can plan, manage and optimize its resources and processes holistically, thereby creating a solid foundation for growth and adaptation in a dynamic business environment which can be seen in Figure 2.

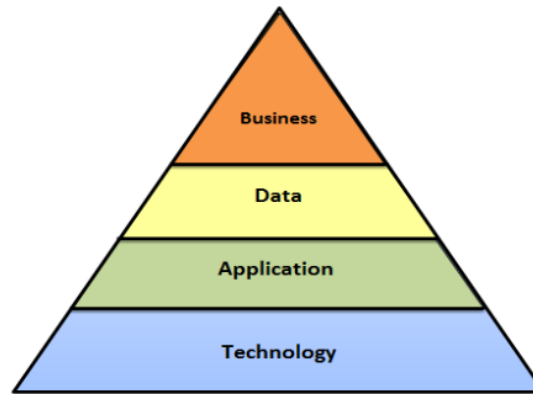


Figure 2. Lapisan Enterprise Architecture

3.1.3 The Open Group Architecture Framework (TOGAF) ADM

TOGAF (The Open Group Architecture Framework) is a framework for developing company Enterprise Architecture (EA) with an approach to design, planning, implementation and management of enterprise information system architecture. Usually, modeling is carried out at four levels, namely the Business, Application, Data and Technology levels. This process relies on standardization, modularization, existing products, and technology.

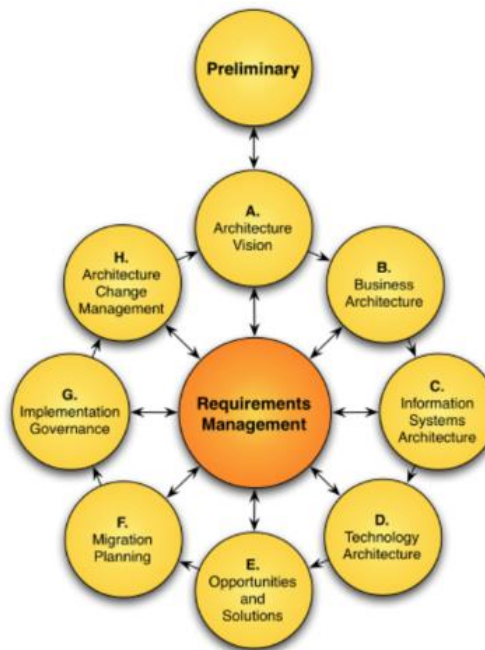


Figure 3. TOGAF ADM Phase Version 9.2

Figure 3 above shows the 9 phases of TOGAF ADM version 9.2. The description of the phase cycle in the TOGAF ADM framework above can be explained as follows:

1. *Preliminary Phase*, Preparatory phase for establishing architectural capabilities, including TOGAF adjustments and defining architectural principles to ensure all parties involved are successful in the architectural process.
2. *Fase A: Architecture Vision*, is the initial stage of the architectural development cycle to determine the scope, identify the parties involved, develop an architectural vision, and obtain approval to begin architectural development.
3. *Fase B: Business Architecture*, business architecture development stage to support the agreed architectural vision using modeling tools and methods such as *Definition Integration (IDEF)* and *Unified Modeling Language (UML)* to build models.
4. *Fase C: Information Systems Architecture*, focuses on developing information system architectures including data architectures and application architectures used by organizations, with the use of techniques such as ER-Diagrams, *Class Diagrams*, and *Object Diagram*.

5. Phase D: *Technology Architecture*, the stage of building the desired technology architecture to determine the type of technology required to use *Technology Portfolio Catalog*, with consideration of alternatives in technology selection.
6. Phase E: *Opportunities and Solutions*, the process of evaluating current architectural models and goals. Identification of key projects is also carried out for the implementation of the goal architecture, and classify them as new developments or reuse of existing systems.
7. Fase F: *Migration and Planning*, process risk and cost analysis by selecting implementation projects based on priorities with interpretation of dependencies, costs, and benefits. The project priority list is used as the basis for detailed implementation planning and migration plans.
8. Fase G: *Implementation Governance*, architectural implementation monitoring process.
9. Fase H: *Architecture Change Management*, the process of developing procedures to manage changes to a new architecture, how to manage changes, from simple maintenance to architectural redesign.

3.1.4 Archimate

ArchiMate is The Open Group's open, independent modeling language for enterprise architecture, supported by a variety of tool vendors and consulting firms. ArchiMate provides tools to support enterprise architects in explaining, analyzing and visualizing relationships between architectural domains in a clear way, similar to other established disciplines such as civil engineering or building construction by using internationally accepted standards to explain their designs.

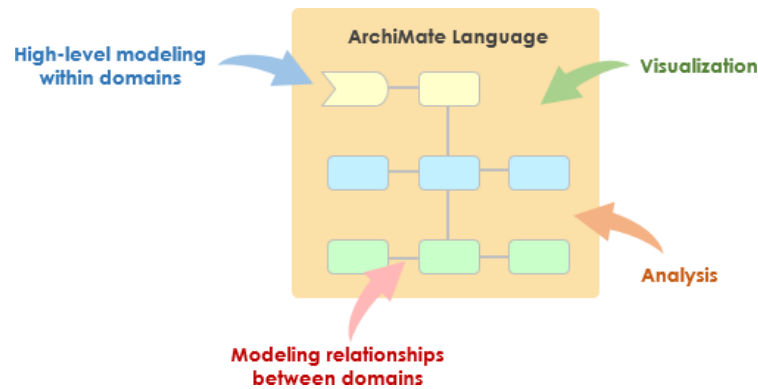


Figure 4. Archimate Specifications

As seen in Figure 4 above, the main reasons for enterprise architects to adopt ArchiMate are first to capture the concerns of stakeholders within the enterprise, second to address these concerns by identifying and refining existing requirements, third to create an effective enterprise architecture model, fourth to create a view of the model that can be understood by stakeholders, fifth to show how concerns and requirements will be addressed, and sixth to show considerations or compromises that arise due to conflicting concerns. By adopting ArchiMate, enterprise architects can manage these concerns and requirements systematically and ensure a clear understanding of the proposed architectural solution.

4. Discussion

4.1 Preliminary Phase

At this point, initial planning and activities are described by determining the 5W+1H design carried out to achieve the company's architectural business goals. This phase includes the definition of critical elements, such as identifying the scope and principles of enterprise architecture, which involve establishing enterprise capabilities. A principle catalog artifact was created for this situation. This phase covers the principles of technology, data, business, and application architecture. To help architectural companies design, this catalog is created based on documents *Open Group*.

4.2 Architecture Vision

In the initial stages of business architecture design, the importance of business architecture for achieving the company's business goals is explained. At this point, stakeholder identified, the enterprise architectural vision is described, and such artifacts document map matrix stakeholder, value chain diagram, and solution concept diagram created. Companies usually use architectural vision in TOGAF ADM to determine business architecture, data architecture, application architecture and technology architecture design goals. Table 1 contains an analysis of the architectural vision.

Table 1. Analysis of architectural vision with architectural principles at PT. XXX.

Principles of Architecture	Proposed Architectural Vision
Data Architecture	Use Big Data in archiving, security and analyzing customer data on service applications online customer.
Business Architecture & Application Architecture	Developing features virtual account which makes it easy for customers to pay on the app.
Business Architecture	Integrate all existing services. Record the progress of reports regarding customer complaints.
Technology Architecture	Development of internet-based customer service applications that require a network and server.

4.3 Business Architecture

Phase Business Architecture, as the second stage in TOGAF ADM for designing company architecture, aims to identify architectural perspectives that suit business needs and explain the ongoing business architecture and its development targets. The process in this stage involves various aspects, including business processes, organizational functions, services, and strategies that support the agreed architectural vision. This stage begins with selecting a relevant business architecture reference model, which is based on business driver and stakeholder needs.

This stage determines the overall modeling process, including structured analysis, analysis use case, and process modeling to identify catalogues, matrices and diagrams that will be used in this research. In structured analysis, a company's key business functions are identified and mapped into organizational units. Meanwhile, analyze use case identify actors involved in technology and information functions. Output from Phase Business Architecture who became one output important is Driver/Goal/Objective Catalog which explains the supporting measures so as to enable the company to understand which contributions are similar to its business performance.

Table 2. Driver/Goal/Objective Catalog

Catalog	Catalog Contents	Description
Driver	<ul style="list-style-type: none"> - Every year, the company achieves <i>Key Performance Indicators</i> to achieve goals in accordance with the established vision and mission. - There is an increase in requests from customers, and companies must be responsive in managing and handling these requests. 	<ul style="list-style-type: none"> - As a measure of performance in achieving company goals - Companies need business development with technology to make it easier to handle customer requests
Goal	<ul style="list-style-type: none"> - Integrated IT development. - Increased operational efficiency in the use of information technology. - Increased optimization of human resources. 	<ul style="list-style-type: none"> - Aligned integration between business processes and information technology. - Effective use of information technology to support company business activities. - Optimizing employees in the Human Resources Division to support the company's business operations.

Objective	<ul style="list-style-type: none"> - Building an integrated information technology environment. - Improving information technology infrastructure and security systems. - Increased risk awareness and information technology governance. - Increase employee productivity in the Human Resources and Information departments. 	<ul style="list-style-type: none"> - Align and optimize all information technology components in an integrated manner. - Improved infrastructure to support the development of information technology. - Increasing risk awareness as a preventive measure and improving information technology governance. - Improving employee performance in the Human Resources and Information departments, especially in more structured and planned data processing.
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4.4 Data Architecture

4.4.1 Entity Relationship Diagram

Entity-Relationship Diagram is a type of database modeling method used is a system semantic data model. Entity-relationships are different objects because they have relationships that connect them to each other, while attributes form the characteristics of each entity with a number of conventions. An entity is a parent that describes data, or a word that can individually represent something real that represents something else.

4.4.2 Class Diagram

Class Diagram is a visual type of static structure diagram in the Unified Modeling Language (UML) that represents the structure of a system by involving system classes and the relationships between them. In software engineering and systems design, class diagrams are widely used to visualize and document static aspects of a system.

4.5 Application Architecture

Application Architecture are the design concepts and structures underlying the development of software applications. In the context of TOGAF, Application Architecture has a key role in helping to design structures clearly. The Application Architecture description in TOGAF provides structured guidance to ensure that application development is in accordance with established business needs and strategies. This helps improve consistency, scalability, and flexibility in enterprise IT environments.

4.5.1 Interface Catalog

Interface Catalog is a document or reference that details information related to the interface (interface) used by the application. Each interface is described in detail including the data format used, the communication protocol implemented, and the methods or functions that can be called.

4.5.2 GAP Analysis Application Architecture

Application Architecture GAP analysis refers to the process of assessing the differences between the desired application architecture (Target) and the current application architecture (Baseline). This analysis helps an organization or architectural team to identify “gaps” or differences between the current state and the desired state in system development or design.

4.6 Technology Architecture

Technology Architecture in TOGAF refers to the architectural domain that focuses on technological aspects in an organization. It includes elements such as hardware, software, networks, databases, and other technologies that support the operations and implementation of architectural solutions

4.7 Opportunities and Solution

The Opportunities and Solutions stage is when the completed enterprise architecture design is assessed. Stakeholders can choose and decide which architecture will be executed by using the results of Opportunities and Solutions as a guide in the enterprise architecture implementation strategy. IT assistance is important to increase a business's capacity to deliver value, provide exceptional customer service, and run effective, efficient, and optimal business operations. IT developments contain dangers that need to be managed well in addition to providing convenience, flexibility and the possibility of several new business prospects. A company's ability to manage information and communications technology effectively is critical to its success. Therefore, we need an application that can help or feature payments via virtual accounts.

4.8 Migration Planning

The system move process that intends to manage and implement changes across an organization's portfolio involves ensuring the implementation design and guiding the system move with the help of migration planning. The Architecture Roadmap is one of the documents that will be produced during the migration planning step; Table 1 describes these artifacts. The proposed solutions are included in the architecture roadmap, which will be finalized and implemented at a later date.

4.9 IT Roadmap

An IT Roadmap is a recommendation derived from previously established enterprise architecture goals. Creating an IT roadmap relates to the desired design during the Business, Application and Technology architecture phases, with a projected duration of nine years. The IT Roadmap can be seen in the following table.

4.10 Enterprise Architecture Testing

The enterprise architecture scorecard approach was used in this enterprise architecture examination, and respondents were given a questionnaire with multiple choice questions. In this stage of design Enterprise Architecture is being evaluated to determine its validity, therefore testing is required. An interview approach is then used to carry out this test. Operations managers and assistant operations managers will be asked to complete a series of interview questions on the EA scorecard with the following guidelines.

- Fill in 2, with a note that the design results for each area are appropriate, clear and well recorded.
- Fill in 1, if the design results for each area are only loosely defined and recorded.
- Fill in 0, if the design results for each area are not defined, not documented, or not defined and documented.

After determining the value of each level, the total value is determined by adding up the four values and dividing by four. After that, the validity of the design can be evaluated using the test results criteria, which are divided into the following categories:

- If the results are <50% the design is considered invalid.
- If the results are >50% the design is considered valid.

5. Conclusion

Based on enterprise planning architecture with TOGAF 9.2 above, which comes from enterprise planning enterprise architecture for customer service applications, includes basic design (baseline) and target architecture (targets), which are presented in the form of diagrams, matrices and catalogs. Significant changes occur from the business architecture phase to the technology architecture phase. In the business architecture phase, analysis baseline resulted in the addition of tracking features to the complaint service and expansion of services through payment integration. In the application architecture phase, complaint tracking application components and virtual account applications were added to the payment function.

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